Open Access Emergency Medicine

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Accuracy of FAST-ED for Assessment Large Vessel Occlusion of Acute Ischemic Stroke in Emergency Department

Chatchanan Pornpanit[1], Punnaporn Loymai[1], Nattaphol Uransilp[2], Winchana Srivilaithon[1]

[1]Department of Emergency Medicine, Faculty of Medicine, Thammasat University, Khlong Luang, Pathum Thani Province, Thailand; [2]Division of Neurology, Department of Medicine, Faculty of Medicine, Thammasat University, Khlong Luang, Pathum Thani Province, Thailand

Correspondence: Winchana Srivilaithon, Department of Emergency Medicine, Faculty of Medicine, Thammasat University, 99/209 Phahon Yothin Road, Klong Luang District, Pathum Thani Province, Thailand, 12120, Tel 668-6366-9260, Email winchanas@gmail.com

Background: Acute large vessel occlusion stroke (LVOS) requires swift and precise assessment for effective treatment. The Field Assessment Stroke Triage for Emergency Destination (FAST-ED) protocol shows promise for rapid LVOS evaluation but lacks extensive validation. This study aims to assess the accuracy of FAST-ED in predicting LVOS and compare its predictive capability with the National Institute of Health Stroke Scale (NIHSS).

Methods: This prospective cross-sectional study was conducted at Thammasat University Hospital. Participants included those aged 18 years or older who presented with symptoms of acute stroke syndrome within 24 hours of onset. The study focused on comparing FAST-ED assessments by emergency department physicians with NIHSS evaluations by neurologists, followed by vascular imaging, which included brain multiphase CT angiography, MRI with MRA, and transcranial Doppler ultrasound combined with carotid Doppler ultrasound. Statistical analyses included the use of AuROC to assess the effectiveness of FAST-ED and to compare FAST-ED with NIHSS.

Results: 130 patients were included in the analysis, with 47 diagnosed with LVOS. No significant differences were found in most baseline characteristics between LVOS and non-LVOS groups, except for a higher prevalence of atrial fibrillation and lower systolic blood pressure in the LVOS group. The FAST-ED scale demonstrated a fair ability to predict LVOS with an AuROC of 0.79 (95% confidence interval (CI); 0.70, 0.87). A FAST-ED cut point of ≥4 showed improved specificity and likelihood ratio. Comparing FAST-ED≥4 with NIHSS≥6 revealed similar AuROC (0.74, 95% CI; 0.65, 0.82 and 0.72, 95% CI; 0.64, 0.80, respectively), with no significant statistical difference (p=0.661).

Conclusion: FAST-ED scale, especially with a cut-off point of ≥4, exhibits fair overall accuracy in predicting LVOS in patients who presented with suspected acute stroke within 24 hours at the ED. This predictive capability is closely comparable to that of the NIHSS at a cut-off point of ≥6.

Keywords: stroke, large vessel occlusion, scale, emergency medical service, emergency department

Introduction

Stroke is the second leading cause of disability and death globally. A 2019 review reports about 12 million new stroke cases annually, with ischemic strokes causing 3.3 million deaths.[1] Acute ischemic stroke care has focused on strategies to preserve brain tissue, with intravenous thrombolysis and endovascular thrombectomy proving effective.[2,3] However, their success depends on timely administration.

Acute large vessel occlusion stroke (LVOS) is a critical subset of ischemic strokes, responsible for about 60% of dependencies and over 90% of post-acute ischemic stroke mortalities. Intravenous thrombolysis is less effective in LVOS, while endovascular thrombectomy significantly improves outcomes.[4] Suspected stroke patients are usually transported to the nearest hospital for thrombolysis, then transferred to specialized centers for thrombectomy. These transfers cause delays and worsen outcomes compared to direct thrombectomy.[5]

Received: 28 February 2024
Accepted: 19 August 2024
Published: 22 August 2024

Patients ineligible for thrombolysis but suspected of LVOS should be directly transported to specialized centers. The National Institute of Health Stroke Scale (NIHSS) is the gold standard for stroke evaluation but requires well-trained personnel for consistent scoring.[6] Various stroke screening tools are available for EMS personnel, but the 2019 AHA/ASA guidelines did not endorse any specific tool due to insufficient evidence.[7]

The Field assessment stroke triage for emergency destination (FAST-ED) protocol may reduce evaluation time for stroke patients, crucial due to the time-sensitive nature of the condition.[8] However, studies on FAST-ED's efficacy and accuracy in LVOS screening are limited. This study aims to evaluate FAST-ED's accuracy in predicting LVOS and compare its predictive capability with NIHSS in suspected acute stroke patients.

Methods

Study Design

A prospective cross-sectional study was conducted from September 2022 to September 2023 at the Emergency department (ED) of Thammasat University Hospital (TUH), Pathum Thani, Thailand. We enrolled all patients who presented to ED with at least one clinical feature of acute stroke syndrome including (1) sudden onset of vertigo, (2) acute blindness, (3) unilateral weakness or sensory loss, (4) facial palsy, and (5) dysarthria or aphasia. The inclusion criteria were (1) age of 18 years or older, and (2) onset of those clinical syndrome within 24 hours. Patients diagnosed with stroke mimics, such as symptomatic hypoglycemia, were excluded. Stroke mimics were excluded from the study to ensure the accuracy and validity of the findings. Including stroke mimics could have confounded the results, as these conditions may present with similar symptoms to acute ischemic stroke but require different diagnostic and treatment approaches. Additionally, patients with stroke mimics often receive other treatments, such as intravenous glucose, which can lead to rapid responses. Consequently, these patients may not undergo the radiological investigations specified in the protocol.

Ethical Approval

This study was approved by Human Research Ethics Committee of Thammasat University (Faculty of Medicine). Project code: MTU-EC-EM-0-166/65. This study was conducted in accordance with the principles outlined in the Declaration of Helsinki. We followed applicable EQUATOR Network (https://www.equator-network.org/) guidelines during the conduct of this research project. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement recommendations. The informed consent process is initiated prior to the commencement of data collection for research. Patients or their close relatives are informed about the research objectives, methodologies, potential risks, and benefits, followed by their execution of a written consent document to participate in the study.

Data Collection Process

Baseline characteristics and demographic data of patients were collected using a standardized case record form by Emergency medicine (EM) residents. The recorded variables included sex, age, mode of ED transportation, time from onset to alert, systolic blood pressure, diastolic blood pressure, Glasgow Coma Scale (GCS) score, and capillary blood glucose levels.

Data were collected from all patients who arrived at the ED with symptoms of stroke, regardless of whether they arrived via the EMS system or on their own. The EM resident (under the supervision of an ED physician) was the first to assess the patients. When a patient met the eligibility criteria, the EM resident activated the Stroke Fast Track code. Following this, a neurology fellow (under the supervision of neurology staff), who was on standby 24 hours a day, would immediately come to the ED to evaluate the patient. All eligible patients underwent an assessment using the FAST-ED scale by the EM resident and the NIHSS by the neurology fellow. Subsequently, these patients were transferred for imaging. Those suspected of ischemic stroke underwent vascular imaging. The selection of vascular imaging modalities, which included brain multiphase CT angiography, MRI with MRA (Magnetic Resonance Angiography) of the brain, and transcranial Doppler ultrasound combined with carotid Doppler ultrasound, was determined based on the discretion of the attending neurologist.

The interpretation of vascular imaging was also conducted by a neurologist in collaboration with a radiologist. In this study, LVOS was defined as an occlusion of the internal carotid artery (ICA) or the M1 segment of the middle cerebral

artery (M1 MCA). The decision on whether it is LVOS is made jointly by the neurology staff and radiology staff immediately after receiving the test results.

To eliminate test review bias in this study, we separated the phases of testing and review. For instance, the initial clinical assessment and the review of test results were conducted by different teams (ED staff and neurology staff) to prevent cross-contamination of information. Radiologists were blinded to the evaluations conducted by the ED staff and neurology staff.

Sample Size Estimation

According to a previous study,[9] patients with a FAST-ED≥4 had a 63% incidence of LVOS, while patients with a FAST-ED<4 had a 31.9% incidence of LVOS. We estimated the sample size for our study using a two-sample comparison of proportions. This estimation was conducted with an alpha of 0.05, a power of 90%, and employing a two-sided test. The calculation was performed using STATA version 14 software (StataCorp LLC, College Station, Texas, USA). After adjusting the calculated number by 10% to account for missing data, the study required the recruitment of 130 patients.

Statistical Analysis

Descriptive data were summarized as mean and standard deviation (SD), median and interquartile range (IQR), or percentage, as appropriate. Comparisons were made between patients diagnosed with LVOS and those who were not. For these comparisons, the unpaired *t*-test was used for continuous variables, and the chi-square test for categorical variables. The area under the receiver operating characteristic curve (AUROC) was utilized to assess the effectiveness of the FAST-ED in predicting LVOS. The optimal cut-off value for FAST-ED was determined based on sensitivity, specificity, and the positive likelihood ratio. A p-value of less than 0.05 was considered statistically significant. Data analysis was performed using the STATA software, version 14 (StataCorp, College Station, TX).

Results

From September 2022 to September 2023, a total of 136 patients, each at least 18 years old and suspected of acute stroke within 24 hours, visited the ED of TUH. Six patients were excluded due to stroke mimic. The remaining 130 eligible patients were included in the analysis. Forty-seven patients (36.2%) were diagnosed with Large Vessel Occlusion Stroke (LVOS), and 83 patients (63.8%) were non-LVOS (Figure 1).

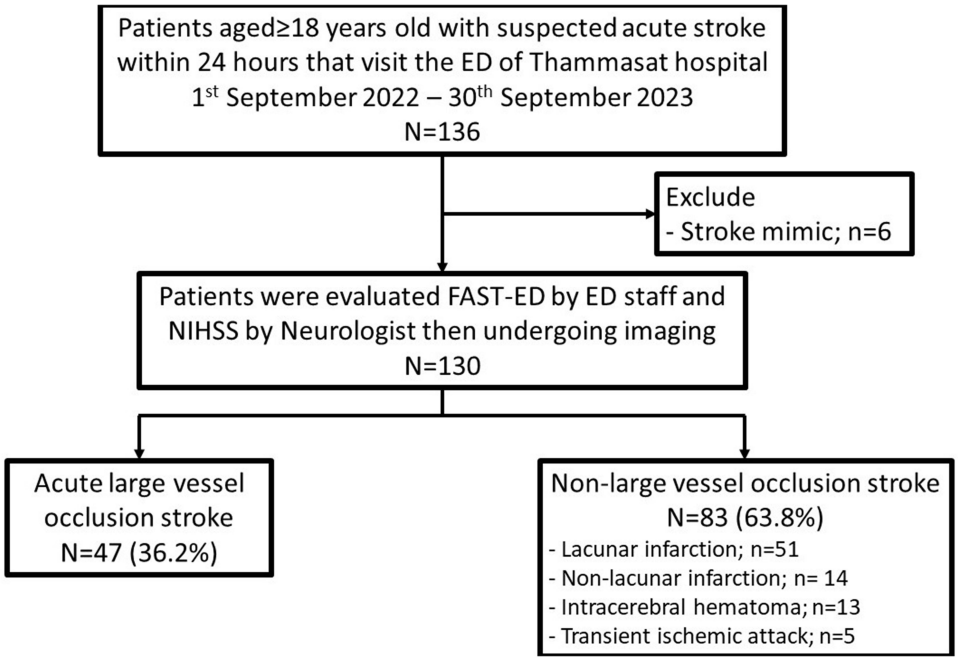

Figure 1 Flow of the study.

Abbreviations:. ED, Emergency department; FAST-ED, Field assessment stroke triage for emergency destination; NIHSS, National Institute of Health Stroke Scale; LVO, Acute large vessel occlusion stroke; ICH, intracerebral hemorrhage; TIA, transient ischemic attack.

Table 1 presents the characteristics of patients along with the results from the univariable analysis comparing the LVOS and non-LVOS groups. There were no statistically significant differences in age, gender, route of transportation, or time from onset to alert. Conditions such as diabetes, hypertension, dyslipidemia, coronary artery disease, and other underlying diseases also showed no significant differences between the groups, except for atrial fibrillation, which had a higher prevalence in the LVOS group (71.43% vs 28.57%; p=0.046). The physiological parameters of the patients showed no significant differences between the groups, except that systolic blood pressure was slightly lower in the LVOS group (148.7 mmHg compared to 168.2 mmHg; p<0.001). The FAST-ED scale and NIHSS scores were significantly higher in the LVOS group (p<0.001).

Table 2 focuses on selecting scale cut points for the FAST-ED scale, evaluating their sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy, and likelihood ratios (LR+ and LR-). As the cut point increases, there is a trade-off between sensitivity and specificity. Specifically, at a cut point of ≥4, the sensitivity decreases to 76.6%, while the specificity increases to 65.1%, thereby improving the rate of correctly classified cases to 69.2%. At this cut point, the PPV and NPV are 55.4% and 83.1%, respectively. The FAST-ED with a cut point of ≥4

Table 1 Patients' Baseline Characteristics. FAST-ED; Field Assessment Stroke Triage for Emergency Destination

Patient Characteristic	LVOS n= 47		Non LVOS n= 83		p-value
	N	%	N	%	
Gender					0.626
Male	27	57.4	44	53.0	
Female	20	42.6	39	47.0	
Transport					0.199
Emergency medical service	11	23.4	12	14.5	
Self-transport	36	76.6	71	85.5	
Underlying disease					
Atrial fibrillation	5	10.6	2	2.4	0.046
Diabetes	16	34.0	23	27.7	0.449
Hypertension	26	55.3	44	53.0	0.800
Dyslipidemia	15	31.9	27	32.5	0.943
Coronary artery disease	5	10.6	4	4.8	0.102
Other underlying disease	6	12.8	13	15.7	0.653
Age (year) mean (±SD)	63.1 (±15.2)		60.8 (±13.7)		0.392
Systolic blood pressure (mmHg) mean (±SD)	148.7 (±28.1)		168.2 (±28.6)		<0.001
Diastolic blood pressure (mmHg) mean (±SD)	88.9 (±23.0)		95.8 (±18.1)		0.062
Heart rate (rate/min) mean (±SD)	84 (±16.7)		82.4 (±14.9)		0.562
Glasgow coma					0.071
13–15	37	78.7	74	89.2	
9–12	10	21.3	7	8.4	
≤ 8	0	0	2	2.4	
Capillary blood glucose (mg%)					0.310
80–180	37	78.7	71	85.5	
>180	9	21.3	12	14.5	
Onset to alert (hours)					0.746
<4.5	33	70.2	56	67.5	
4.5–24	14	29.8	27	32.5	
FAST-ED scale (point) mean (±SD)	5.3 (±2.4)		3 (±1.6)		<0.001
NIHSS (point) mean (±SD)	13.6 (±6.5)		6.4 (±5.1)		<0.001

Abbreviations: NIHSS; National Institute of Health Stroke Scale, LVOS; Acute large vessel occlusion stroke.

Table 2 Selection of Scale Cut Point Sensitivity, Specificity, LR+ and LR+ of the FAST-ED

Cut Point	Sensitivity	Specificity	Correctly Classified	PPV	NPV	Accuracy	LR+	LR-
≥1	100%	2.4%	37.7%	36.7%	100%	37.7%	1.02	0.25
≥2	95.7%	16.9%	45.4%	39.5%	87.5%	45.4%	1.15	0.30
≥3	87.2%	42.2%	58.5%	46.1%	85.4%	58.5%	1.51	0.36
≥4	76.6%	65.1%	69.2%	55.4%	83.1%	69.2%	2.19	0.55
≥5	55.3%	81.9%	72.3%	63.4%	76.4%	72.3%	3.06	0.57
≥6	46.8%	93.9%	76.9%	81.5%	75.7%	76.9%	7.77	0.64
≥7	38.3%	96.4%	75.4%	85.7%	73.4%	75.4%	10.59	0.79
≥8	21.3%	100%	71.5%	100%	69.2%	71.5%		0.87
≥9	12.8%	100%	68.5%	100%	66.9%	68.5%		1.00

Abbreviations: PPV, positive predictive value; NPV, negative predictive value; LR+, likelihood ratio of positive; LR-, likelihood ratio of negative.

shows improvement in predicting LVOS with a likelihood ratio of 2.19, which is more effective compared to lower scores.

Figure 2 presents the Area Under the Receiver Operating Characteristic (AuROC) curve of the FAST-ED scale for predicting LVOS in patients with suspected acute stroke in the ED. The FAST-ED scale demonstrates a fair ability to predict LVOS, as indicated by an AuROC of 0.79 (95% confidence interval (CI); 0.70, 0.87).

Table 3 and Figure 3 present the AuROC of FAST-ED≥4 compared with NIHSS≥6 in the prediction of LVOS. The comparison reveals similar AuROC values for these two scoring systems, with no statistically significant difference (AuROC of 0.74 and 0.72, respectively; p=0.661).

Discussion

In this study, we evaluated patients aged 18 years and older who were suspected of having an acute stroke within 24 hours of their visit to the ED of TUH. The primary aim was to assess the accuracy of the FAST-ED scale in predicting

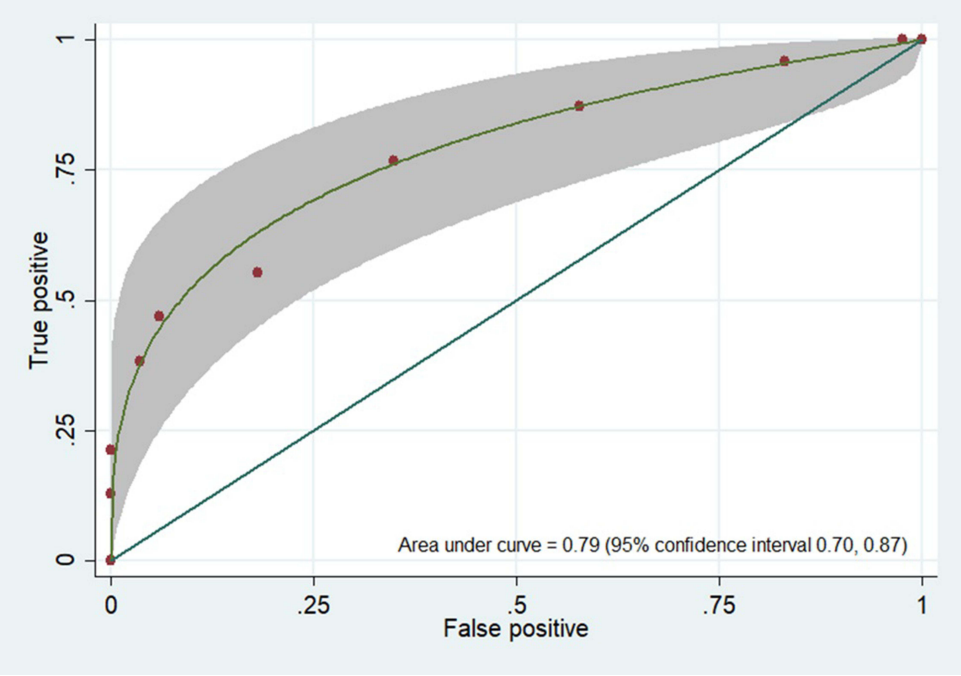

Figure 2 Area Under the Receiver Operating Characteristic (AuROC) curve of the FAST-ED scale for predicting acute large vessel occlusion stroke (LVOS) in patients with suspected acute stroke in the emergency department.

Table 3 Discrimination Power (Area Under Receiver Operating Characteristic Curve, AuROC) of the FAST-ED≥4, versus NIHSS≥6 in Predicting Acute Large Vessel Occlusion Stroke

	AuROC	95% Confidence Interval	p-value
FAST-ED ≥4	0.74	0.65, 0.82	0.661
NIHSS ≥6	0.72	0.64, 0.80	

LVOS and to compare the predictive ability of FAST-ED with NIHSS for LVOS in both pre-hospital and ED settings. Our findings indicate that the overall accuracy of FAST-ED is fair, with the optimal cut-off point being ≥4. Furthermore, we observed that the ability of FAST-ED ≥4 to predict LVOS is closely comparable to that of NIHSS ≥6.

Furthermore, our study found that atrial fibrillation and systolic blood pressure (SBP) are two factors with significant differences between LVOS and non-LVOS cases. Notably, 71% of patients with atrial fibrillation were diagnosed with LVOS. Atrial fibrillation is commonly associated with cardioembolic events, which are a major cause of stroke due to various etiologies.[10] A study by E. Gurkas in 2020 also found that the primary cause of LVOS was a cardioembolic source, which aligns with our findings.[11] Additionally, hypertension is recognized as a risk factor for atrial fibrillation. It can independently cause stroke through multiple mechanisms, such as promoting the progression of atherosclerotic plaques, leading to ischemic stroke.[12] However, in our study, the higher mean systolic blood pressure observed in the non-LVOS group may be attributed to intracerebral hemorrhage (ICH), which can result from increased intracranial pressure.[13]

Patients suspected of LVOS, particularly in the anterior circulation, benefit from mechanical thrombectomy. This procedure improves vessel recanalization, subsequently enhancing functional outcomes.[14] There are several tools for screening LVOS, including FAST-ED, RACE, CPSS, and EMSA. The FAST-ED scale is a feasible screening tool for emergency medical service personnel to determine the appropriate health centers for stroke patients, distinguishing

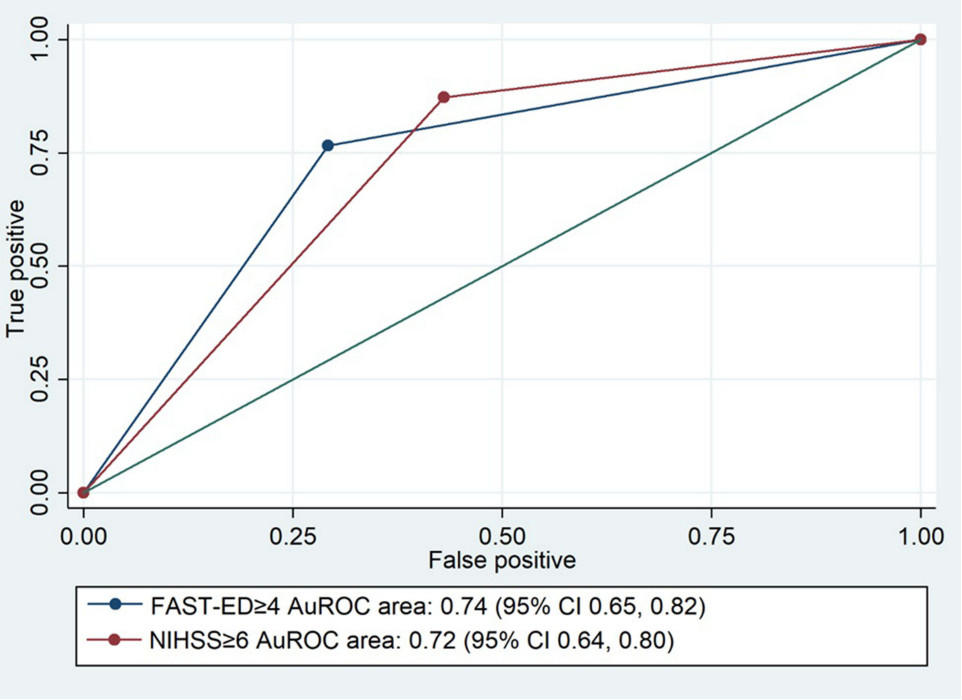

Figure 3 Area Under the Receiver Operating Characteristic (AuROC) of FAST-ED≥4 compared with NIHSS≥6 in the prediction of acute large vessel occlusion stroke (LVOS).

between primary stroke centers and endovascular centers. Inappropriate initial destination can delay mechanical thrombectomy due to the time lost in interhospital transfers. Approximately one out of three stroke patients with LVOS becomes ineligible for mechanical thrombectomy due to prolonged onset time and an unfavorable score on the Alberta Stroke Program Early CT Score (ASPECTS).[15]

Not only in the prehospital setting but also in the Emergency Department (ED), the FAST-ED scale has advantages in expediting the evaluation of acute ischemic stroke. In our study, a FAST-ED score of ≥4 demonstrated a sensitivity of 76.6%, specificity of 65.1%, positive predictive value of 55.4%, negative predictive value of 83.1%, and an accuracy of 69.2%. These findings correlate with the Lima study in 2016, which validated that a FAST-ED score of ≥4 is effective in detecting LVOS.[9] The sensitivity, specificity, positive predictive value, and negative predictive value in the Lima study were 60%, 89%, 72%, and 82%, respectively. Therefore, FAST-ED is an appropriate screening tool for LVOS in both prehospital care and the ED.[16]

Our study demonstrates that the ability of the FAST-ED scale with a cut-off point of ≥4 to predict LVOS is not significantly different from that of the NIHSS with a cut-off point of ≥6. As a result, both FAST-ED and NIHSS can be used interchangeably in both ED and pre-hospital settings for the effective prediction of LVOS.

Limitation

The assessment of the FAST-ED scale and NIHSS were performed upon arrival at the ED, rather than in the pre-hospital setting. Although this approach was chosen to ensure the highest accuracy by having patients evaluated by the most relevant specialists, it does not fully capture the potential effectiveness and applicability of the scoring system in the pre-hospital environment. This discrepancy between the study's focus and the introduction's emphasis on pre-hospital assessment may limit the generalizability of the findings to pre-hospital settings, where early identification and assessment of stroke severity are crucial for improving patient outcomes.

In our study, the FAST-ED scale was utilized for patient evaluation by EM resident or ED physicians. However, in the pre-hospital setting, there are various levels of EMS personnel, including Emergency Medical Technicians (EMT), Paramedics, Emergency Nurse Practitioners (ENP), and Emergency Physicians. Consequently, the sensitivity and specificity of the FAST-ED scale may be influenced by the varying competencies of these personnel. It is important to note that this study was conducted at a single academic center, which may impact the generalizability of the findings.

Conclusion

In conclusion, the FAST-ED scale, especially with a cut-off point of ≥4, exhibits fair overall accuracy in predicting LVOS in patients who presented with suspected acute stroke within 24 hours at the ED. This predictive capability is closely comparable to that of the NIHSS at a cut-off point of ≥6. These findings suggest the potential for interchangeable use of FAST-ED and NIHSS in various clinical settings, effectively predicting LVOS.

Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Acknowledgments

This study is supported by Thammasat University Research unit in Emergency Medicine and Emergency Critical Care.

Author Contributions

All authors made a significant contribution to the work reported, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

There is no funding to report.

Disclosure

The authors declare that there have no competing interests in this work.

References

1. Feigin VL, Brainin M, Norrving B, et al. World Stroke Organization (WSO): global stroke fact sheet 2022. *Int J Stroke*. 2022;17(1):18–29. doi:10.1177/17474930211065917
2. Hurford R, Sekhar A, Hughes TAT, Muir KW. Diagnosis and management of acute ischaemic stroke. *Pract Neurol*. 2020;20(4):304–316. doi:10.1136/practneurol-2020-002557
3. Campbell BCV, Kappelhof M, Fischer U. Role of Intravenous Thrombolytics Prior to Endovascular Thrombectomy. *Stroke*. 2022;53(6):2085–2092. doi:10.1161/STROKEAHA.122.036929
4. Malhotra K, Gornbein J, Saver JL. Ischemic Strokes Due to Large-Vessel Occlusions Contribute Disproportionately to Stroke-Related Dependence and Death: a Review. *Front Neurol*. 2017;8:651. doi:10.3389/fneur.2017.00651
5. Duvekot MHC, Venema E, Rozeman AD, et al. Comparison of eight prehospital stroke scales to detect intracranial large-vessel occlusion in suspected stroke (PRESTO): a prospective observational study. *Lancet Neurol*. 2021;20(3):213–221. doi:10.1016/S1474-4422(20)30439-7
6. Lyden P. Using the National Institutes of Health Stroke Scale. *Stroke*. 2017;48(2):513–519. doi:10.1161/STROKEAHA.116.015434
7. Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2019;50(12):e344–e418. doi:10.1161/STR.0000000000000211
8. Carr BG, Matthew Edwards J, Martinez R. Regionalized care for time-critical conditions: lessons learned from existing networks. *Acad Emergency Med*. 2010;17(12):1354–1358. doi:10.1111/j.1553-2712.2010.00940.x
9. Lima FO, Silva GS, Furie KL, et al. Field Assessment Stroke Triage for Emergency destination: a simple and accurate prehospital scale to detect large vessel occlusion strokes. *Stroke*. 2016;47(8):1997–2002. doi:10.1161/STROKEAHA.116.013301
10. Khurshid S, Trinquart L, Weng L-C, et al. Atrial Fibrillation Risk and Discrimination of Cardioembolic From Noncardioembolic Stroke. *Stroke*. 2020;51(5):1396–1403. doi:10.1161/STROKEAHA.120.028837
11. Gurkas E, Akpınar CK, Ozdemir AO, Aykac O, Önalan A. Is cardioembolic stroke more frequent than expected in acute ischemic stroke due to large vessel occlusion? *Eur Rev Med Pharmacol Sci*. 2023;27(9):4046–4052. doi:10.26355/eurrev_202305_32310
12. Yu JG, Zhou RR, Cai GJ. From hypertension to stroke: mechanisms and potential prevention strategies. *CNS Neurosci Ther*. 2011;17(5):577–584. doi:10.1111/j.1755-5949.2011.00264.x
13. Dandapani BK, Suzuki S, Kelley RE, Reyes-Iglesias Y, Duncan RC. Relation Between Blood Pressure and Outcome in Intracerebral Hemorrhage. *Stroke*. 1995;26(1):21–24. doi:10.1161/01.STR.26.1.21
14. Bhatia K, Bhagavan S, Bains N, et al. Current Endovascular Treatment of Acute Ischemic Stroke. *Mo Med*. 2020;117(5):480–489.
15. Mokin M, Gupta R, Guerrero WR, Rose DZ, Burgin WS, Sivakanthan S. ASPECTS decay during inter-facility transfer in patients with large vessel occlusion strokes. *J Neurointerv Surg*. 2017;9(5):442–444. doi:10.1136/neurintsurg-2016-012331
16. Daly M, Cummings C, Kittell M, et al. Validation of field assessment stroke triage for emergency destination for prehospital use in a rural EMS system. *Am J Emerg Med*. 2021;50:178–182. doi:10.1016/j.ajem.2021.07.035